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Composite Weld Rod Corrects Individual Filler Weaknesses

The problem:

To weld together an assembly fabricated from components of Rene 41 nickel base alloy. Wire of the parent metal proved unsatisfactory due to extreme cracking problems. Hastelloy W filler wire, while demonstrating virtually complete freedom from weld cracking, did not respond to heat treatment and did not possess the strength of the parent metal.

The solution:

A composite filler of equal parts Rene 41 weld wire and Hastelloy W weld wire.

How it's done:

One 36-inch length of 0.030-inch Hastelloy W weld wire and one 36-inch length of 0.030-inch Rene 41 weld wire are combined by weaving them together and the composite is fed to the workpiece to simultaneously form the weld puddle.

Notes:

1. The wetting and flow characteristics of this composite filler proved superior to those of Hastelloy W.

2. In tensile tests to destruction, failure occurred within the weld fusion zone at all elevated temperatures. At room temperature, failure occurred both within the weld fusion zone and at the weld fusion zone-weld heat affected zone interface. Examination of the fractures revealed no defects.
3. Inquiries concerning this invention may be directed to:

Technology Utilization Officer
Marshall Space Flight Center
Huntsville, Alabama 35812
Reference: B67-10107

Patent status:

Inquiries about obtaining rights for the commercial use of this invention may be made to NASA, Code GP, Washington, D.C. 20546.

Source: S. Grimaldo
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